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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,380	09/11/2003	Stephen Belair	1370.007US1	6020

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EXAMINER	
MOFIZ, APU M	

ART UNIT	PAPER NUMBER
2165	

DATE MAILED: 04/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/660,380	BELAIR ET AL.	
	Examiner	Art Unit	
	Apu M. Mofiz	2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/11/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-63 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al., MultiJav: A Distributed Shared Memory System Based on Multiple Java Virtual Machines, Utah State University, 1998 and hereinafter referred to as Chen.

As to claims 1,28-32,34-35,37-38,41-42,44-45,49,53,57 and 59-60, Chen teaches a method for sharing data within a distributed computing system having a plurality of nodes, wherein each node includes a processor and memory, the method comprising: distributing an application across two or more nodes, including a first and a second node, wherein distributing the application includes creating application processes, associating the application processes with a group and distributing the application processes to the first and second nodes (i.e., MultiJav has fine granularity provided by sharing objects (page 1, slide 1) … Page-based systems normally have a single virtual address space – Suffer from high cost of false sharing Object-based systems share variables or objects. – **Shared objects sometimes combined with synchronization variables or need acquire/store operations**. (page 2, slide 2) … All shared objects are located in shared memory (heap) as dynamically allocated blocks. (page 2, slide 2) … **Parallel**

programs start on one machine, and spawned threads migrate to other machines. (page 3, slide 1) ... **Java uses a monitor concept for synchronization**. Operations of a thread on a **monitor: - Enter: gain exclusive access to the object – Exit: relinquish exclusive access to the object** (page 3, slide 2) ... **Threads at three sites compete for the lock** a) Site 1 is the owner of the monitor. Several threads wait in the WQs of the three sites. There are 2 requesting threads for Site 2 and 3. (page 4, slide 1) ... **Objects are accessed through global handles. Each site maintains global handle table with reference to handle of local copy and reference count information**. At first access of remote data, object is retrieved from remote site and local handle is allocated. (page 5, slide 1) ... Volatile variables enforce sequential consistency. (page 5, slide 2) The preceding text excerpts clearly indicate that Chen teaches a distributed shared memory system where Chen addresses the same shortcomings as the Applicant stated e.g., granularity of page based system, false sharing etc. Chen teaches that an Application spawns/creates multiple threads/processes across multiple machines/nodes. Chen teaches an object (an object by definition has to defined and allocated in the memory) based system where multiple processes/threads share these objects. These objects are accessed through handles. Handles by definition (oo programming) are references/pointers to other objects. Handles have to have a name assigned to them otherwise they are useless. Handle means that someone through the handle accesses other objects, and without a name an object is not able to use a handle. **Like any other resources when several processes/threads need to access a single resource there has to be an order otherwise the**

integrity/consistency/coherency of the resource/object is not maintained. In this case, **Chen teaches using a monitor wherein several threads/processes register with the monitor to access a resource/object. The objects use a variable for synchronization/sharing policy. The threads query the monitor, which monitors/tracks the ownership status of the data object**. When one process/thread is done with the object it releases/transfers the ownership of the object to other processes/second node via the monitor. The processes from different nodes/machines access objects in a different machine. The Applicant in various dependent claims states programming implementation details and software per se is not a patentable feature. Finally, Chen like the Applicant uses an object based distributed shared memory system where multiple threads/processes from various machines/nodes accesses/shares data objects in multiple nodes/machines. The consistency/coherency/synchronization is maintained with the use of a monitor where multiple processes registers with the monitor, and the monitor tracks/monitors the ownership status of the data objects. The data objects are accessed through handles/references. When individual processes/threads inquire about the object it has to send/export the handle to the monitor. The processes only can identify the objects by their handle. **The handles are in a global handle table/vector with reference to handle of local copy/local object handle and reference count information.**); defining a data object in memory on the first node, wherein defining a data object includes allocating memory for the data object (See explanations above); assigning a name to the data object; mapping the name to a data

object handle (See explanations above); and accessing data within the data object through references to the data object handle (See explanations above).

As to claims 2, Chen teaches wherein defining a data object further includes setting a data sharing policy for the data object (See text excerpts and explanations in the claim 1 rejection above).

As to claim 3, Chen wherein accessing data includes querying a mapping service process with the data object name in order to retrieve the data object handle associated with the data object name (See text excerpts and explanations in the claim 1 rejection above).

As to claim 4, Chen teaches wherein accessing data includes determining ownership of the data object and requesting transfer of the ownership of the data object to a process on the second node (See text excerpts and explanations in the claim 1 rejection above).

As to claim 5,33 and 40, Chen teaches wherein associating the application processes with an application group includes establishing a group service process on one or more nodes, wherein each group service process tracks membership of processes in groups (See text excerpts and explanations in the claim 1 rejection above).

As to claim 6, Chen teaches wherein each group service process tracks formation of an application group, joining of processes to the application group and exit of application processes from the application group (See text excerpts and explanations in the claim 1 rejection above).

As to claim 7, Chen teaches wherein the group service process differentiates between accesses to a data object stored within memory of the node on which the group service process executes and accesses to a data object stored within memory of another node (See text excerpts and explanations in the claim 1 rejection above).

As to claim 8, Chen teaches wherein the group service process synchronizes access to and sharing of data structures between application processes on different nodes (See text excerpts and explanations in the claim 1 rejection above).

As to claim 9, Chen teaches wherein accessing data includes querying a mapping service process with the data object name in order to retrieve the data object handle associated with the data object name (See text excerpts and explanations in the claim 1 rejection above).

As to claim 10, Chen teaches wherein accessing data includes determining ownership of the data object and requesting transfer of the ownership of the data object

to a process on the second node (See text excerpts and explanations in the claim 1 rejection above).

As to claims 11, 33 and 43, Chen teaches wherein associating the application processes with an application group includes: registering the application as a group; and establishing a group service process on one of the nodes, wherein the group service process tracks membership of processes in groups (See text excerpts and explanations in the claim 1 rejection above).

As to claims 12,39,46,50,54,55,58,61 and 62, Chen teaches wherein accessing data within the data object includes obtaining a coherency state for the data object, wherein obtaining a coherency state includes accessing the group service process via the data object handle (See text excerpts and explanations in the claim 1 rejection above).

As to claims 13, 47 and 51, Chen teaches wherein associating the processes with an application group includes establishing a group service process on each of the nodes, wherein the group service process on each node tracks membership in groups of processes local to its respective node (See text excerpts and explanations in the claim 1 rejection above).

As to claim 14, Chen teaches wherein each group service process tracks formation of a process group, joining of local processes to the process group and exit of

local processes from the process group (See text excerpts and explanations in the claim 1 rejection above).

As to claim 15, Chen teaches wherein the group service process executing on the first node differentiates between accesses to a data object stored within memory of the first node and accesses to a data object stored within memory of another node (See text excerpts and explanations in the claim 1 rejection above).

As to claim 16, Chen teaches wherein each data object is owned by a owner process and wherein the group service process of the node where the owner process executes synchronizes access to and sharing of its respective data object between processes on different nodes (See text excerpts and explanations in the claim 1 rejection above).

As to claim 17, Chen teaches wherein mapping the name to a data object handle includes establishing a mapping service process on one of the nodes (See text excerpts and explanations in the claim 1 rejection above).

As to claim 18, Chen teaches wherein accessing data within the data object includes obtaining a coherency state for the data object wherein obtaining a coherency state includes accessing, via the data object handle, the group service process local to

the node of the process seeking access to the data object (See text excerpts and explanations in the claim 1 rejection above).

As to claim 19, Chen teaches wherein accessing data includes querying a mapping service process with the data object name in order to retrieve the data object handle associated with the data object name (See text excerpts and explanations in the claim 1 rejection above).

As to claim 20, Chen teaches wherein accessing data includes querying a mapping service process with the data object name in order to retrieve the data object handle associated with the data object name and querying one or more group service processes with the data object handle in order to access the data object (See text excerpts and explanations in the claim 1 rejection above).

As to claim 21, Chen teaches wherein accessing data within the data object includes obtaining a coherency state for the data object via the data object handle (See text excerpts and explanations in the claim 1 rejection above).

As to claim 22, Chen teaches wherein mapping the name to a data object handle includes exporting the data object handle to a local group service process (See text excerpts and explanations in the claim 1 rejection above).

As to claim 23, Chen teaches 23 wherein exporting includes accumulating two or more data object handles and exporting the two or more data object handles to the local group service process with a single export call, wherein the two or more data object handles are grouped in a vector within the export call (See text excerpts and explanations in the claim 1 rejection above).

As to claim 24, Chen teaches wherein allocating memory for the data object includes dividing a data structure into a number of data objects, wherein the number is a function of the type of application being executed (See text excerpts and explanations in the claim 1 rejection above).

As to claims 25 and 36, Chen teaches wherein mapping the name to a data object handle includes exporting the data object handle associated with each data object to a local group service process (See text excerpts and explanations in the claim 1 rejection above).

As to claim 26, Chen teaches wherein each data object has a data object size that is the smallest unit of update of the data object (See text excerpts and explanations in the claim 1 rejection above).

As to claim 27, Chen teaches wherein associating the processes with a group includes registering the application as a group and joining the processes to the group (See text excerpts and explanations in the claim 1 rejection above).

As to claims 48,52,56 and 63, Chen teaches 48. The system according to claim 47, wherein each node includes means for multicasting to the other nodes a request to identify who owns the data object (See text excerpts and explanations in the claim 1 rejection above).

Points of Contact

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Apu M. Mofiz whose telephone number is (571) 272-4080. The examiner can normally be reached on Monday – Thursday 8:00 A.M. to 4:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached at (571) 272-4146. The fax numbers for the group is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

Apu M. Mofiz
Primary Patent Examiner
Technology Center 2100

April 26,2006